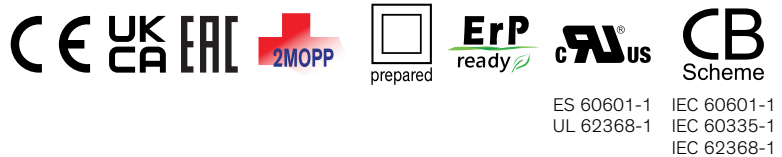


- High power density power supply (encapsulated)
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75  $\mu$ A rated for BF applications
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Protection class II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, no load power consumption <75 mW
- 5-year product warranty



The TPP 15-J AC/DC power supplies feature a reinforced double I/O isolation system according to medical safety standards IEC/EN/ES 60601-1 3rd edition for 2 x MOPP approved for an operating altitude of 5000 m. The earth leakage current is below 75  $\mu$ A what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 88.5% offers a high power density in the packaging format 1.1" x 2.8". The full load operating temperature range covers  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  while it goes up to  $85^{\circ}\text{C}$  with 50% load derating. The units operate in compliance to the medical EMC emission and immunity levels according to latest standard IEC 60601-1-2 4th edition.

Models				
Order Code	Output Power max.	Output Voltage nom.	Output Current max.	Efficiency typ.
TPP 15-103-J	13.2 W	3.3 VDC	4'000 mA	84 %
TPP 15-105-J	15 W	5 VDC	3'000 mA	86 %
TPP 15-109-J		9 VDC	1'670 mA	86 %
TPP 15-112-J		12 VDC	1'250 mA	87 %
TPP 15-115-J		15 VDC	1'000 mA	87 %
TPP 15-124-J		24 VDC	625 mA	88 %
TPP 15-136-J		36 VDC	417 mA	88 %
TPP 15-148-J		48 VDC	313 mA	89 %

### Input Specifications

Input Voltage	- AC Range	Operational Range: <b>85 - 264 VAC</b> (Full Range) Rated Range: <b>100 - 240 VAC</b> (Full Range)
	- DC Range	Operational Range: <b>120 - 370 VDC</b> (Designed for, no certification) Polarity: <b>+DC: L / -DC: N</b>
Input Frequency		Operational Range: <b>47 - 440 Hz</b> Certified: <b>50/60 Hz</b>
Input Current	- Full Load & Vin = 230 VAC	<b>300 mA max.</b>
	- Full Load & Vin = 115 VAC	<b>450 mA max.</b>
Power Consumption	- No load & Vin = 230 VAC	<b>75 mW max.</b> (Ready to meet ErP directive)
	- No load & Vin = 115 VAC	<b>75 mW max.</b>
Input Inrush Current	- At 230 VAC	<b>40 A max.</b>
	- At 115 VAC	<b>25 A max.</b>
Input Protection		<b>T 1.6 A / 250 VAC</b> (Internal Fuse)
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)

### Output Specifications

Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	<b>0.2% max.</b>
	- Load Variation (0 - 100%)	<b>0.7% max.</b> (3.3 and 5 VDC model)
		<b>0.5% max.</b> (other output models)
Ripple and Noise (20 MHz Bandwidth)	3.3 VDC model:	<b>40 mVp-p typ.</b> (w/ 10 µF X5R)
	5 VDC model:	<b>40 mVp-p typ.</b> (w/ 10 µF X5R)
	9 VDC model:	<b>70 mVp-p typ.</b> (w/ 10 µF X5R)
	12 VDC model:	<b>70 mVp-p typ.</b> (w/ 10 µF X5R)
	15 VDC model:	<b>70 mVp-p typ.</b> (w/ 10 µF X5R)
	24 VDC model:	<b>100 mVp-p typ.</b> (w/ 10 µF X5R)
	36 VDC model:	<b>100 mVp-p typ.</b> (w/ 10 µF X5R)
	48 VDC model:	<b>140 mVp-p typ.</b> (w/ 1 µF X7R)
Capacitive Load	3.3 VDC model:	<b>6'000 µF max.</b>
	5 VDC model:	<b>4'000 µF max.</b>
	9 VDC model:	<b>1'860 µF max.</b>
	12 VDC model:	<b>1'200 µF max.</b>
	15 VDC model:	<b>820 µF max.</b>
	24 VDC model:	<b>470 µF max.</b>
	36 VDC model:	<b>220 µF max.</b>
	48 VDC model:	<b>150 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Hold-up Time	- At 115 VAC	<b>8 ms min.</b>
Start-up Time	- At 230 VAC	<b>500 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>120 - 200% of Iout max.</b>
		<b>145% typ. of Iout max.</b>
Overvoltage Protection		<b>125 - 140% of Vout nom.</b>
Transient Response	- Response Deviation	<b>8% max.</b> (75% to 100% Load Step)
	- Response Time	<b>500 µs typ.</b> (75% to 100% Load Step)

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Household	EN 60335-1 IEC 60335-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1
	- Power Transformers	2 x MOPP (Means Of Patient Protection) IEC 61558-1 IEC 61558-2-16
	- Certification Documents	<a href="http://www.tracopower.com/overview/tpp15-j">www.tracopower.com/overview/tpp15-j</a>
	Protection Class	Class I & II (Prepared): Reinforced Insulation
Pollution Degree	PD 2	
Over Voltage Category	OVC II	

### EMC Specifications

EMI Emissions	- Conducted Emissions	EN 60601-1-2 edition 4 (Medical Devices) EN 55011 class B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC Part 15 class B (internal filter) FCC Part 18 class B (internal filter)
	- Radiated Emissions	EN 55011 class B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC Part 15 class B (internal filter) FCC Part 18 class B (internal filter)
	- Harmonic Current Emissions	EN 61000-3-2, class A
	- Voltage Fluctuations & Flicker	EN 61000-3-3
EMS Immunity	- Electrostatic Discharge	EN 55024 (IT Equipment) EN 55035 (Multimedia) EN 60601-1-2 edition 4 (Medical Devices) EN 55014-2 (Household Appliances Tools) Air: EN 61000-4-2, $\pm 15$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 8$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria A
	- Conducted RF Disturbances	EN 61000-4-6, 20 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A
		115 VAC / 60 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A

### General Specifications

Relative Humidity	95% max. (non condensing)	
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Storage Temperature	-40°C to +85°C

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Power Derating	- High Temperature - Low Input Voltage	Depending on model 4 %/V below 90 VAC See application note: <a href="http://www.tracopower.com/overview/tpp15-j">www.tracopower.com/overview/tpp15-j</a>
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		75 - 95 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s - Input to Case or PE, 60 s - Output to Case or PE, 60 s	4'000 VAC 1'500 VAC 1'500 VAC
Creepage	- Input to Output	8 mm min.
Clearance	- Input to Output	8 mm min.
Isolation Resistance	- Input to Output, 500 VDC	100 MΩ min.
Leakage Current (at 264 VAC)	- Touch Current	75 μA max.
Reliability	- Calculated MTBF	3'100'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration - Mechanical Shock	IEC 60068-2-6 IEC 60068-2-27
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Plastic Case
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		48 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

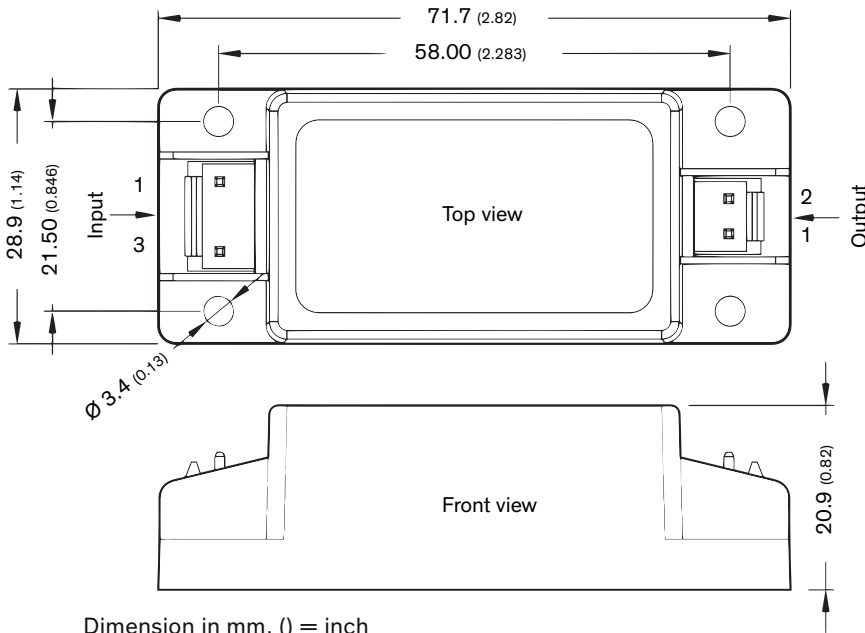
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tpp15-j](http://www.tracopower.com/overview/tpp15-j)

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

**Outline Dimensions**



Dimension in mm, ( ) = inch  
 Tolerances: x.x  $\pm 0.50$  ( $\pm 0.02$ )  
 x.xx  $\pm 0.25$  ( $\pm 0.01$ )

Pin connectors			
Input		Output	
Pin	Function	Pin	Function
1	Line	1	-Vout
3	Neutral	2	+Vout

**Input:** JST series  
 mates with JST crimp terminal: SVH-21T-P1.1  
 and terminal housing: VHR-3N

**Output:** JST series  
 mates with JST crimp terminal: SVH-21T-P1.1  
 and terminal housing: VHR-2N